WIND POWER PROJECT AT JAIBHIM BY SIIL

Document Prepared By Infinite Solutions

Project Title	Wind power project at Jaibhim by SIIL
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Monitoring Period	11-March-2011 to 31-December-2012
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1. PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Serum Institute of India (SIIL) is a manufacturer of immune-biologicals, including vaccines in India. It was incorporated in the year 1984. The company is managed by the Poonawalla group. Today, Serum Institute of India Ltd. has established itself as the world's largest producer of Measles and DTP group of vaccines.

With the growing concerns for the environment, Serum Institute of India Ltd. (SIIL) has undertaken measures to reduce the GHG emissions by conceptualizing and installation wind power project in Maharashtra with efficient utilization of the available wind energy. Initially, it was decided that 18 WTGs of 2.1 MW each would be set up as part of this project activity. However, during project implementation, only 16 WTGs were commissioned. The generated electricity is wheeled to substation through a 33 kV overhead line. The generated electricity will displace equivalent electricity that may have been produced majorly from conventional fuels (generally, fossil fuels). The projects are located at village Jaibhim, Dhule District of Maharashtra State in India.

The project will be utilizing wind energy for generating clean electricity for captive use which would have otherwise been generated through fossil fuel dominated power plants, contributing to reduction in specific emissions (emissions of pollutant) including GHG emissions and also reducing its dependence on fossil fuels for energy requirements.

In the pre-project scenario, the project proponent used the electricity from the NEWNE grid for its internal power consumption. Thus, the project displaces the electricity from the grid and hence, the electricity grid has been taken as the baseline to the project activity. Emission reductions will be claimed on the net electrical energy that is generated for captive use or sold to third party.

The project leads to an annual emission reductions of 52,898 tCO_2e per annum. The first WTG under this project has stated commissioning since 11-March-2011 and has been under operation since then except for regular shutdowns considering O&M requirements.

The project was registered at UNFCCC (Ref. No. 6456) on 28-Nov-2012 and the details of the same can be viewed on https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1340102581.62/view

1.2 Sectoral Scope and Project Type

Sectoral Scope : 01 Energy Industries (renewable-'non renewable)
Project Type : Type 1 Renewable Energy Projects
Project Category : ACM0002 version 12.3.0
Tool : Tool for the demonstration and assessment of additionality (Version 06.0.0, EB 65)
Tool to calculate the emission factor for an electricity system (Version 02.2.1, EB 63)

1.3 Project Proponent

Organization name	Serum Institute of India Limited

Contact person	Mr. Satish Deshpande
Title	Group Director (Accounts & Audit)
Address	Sarosh Bhavan, Dr. Ambedkar Road, Pune
Telephone	+91-20-26100324
Email	shd@seruminstitute.com

1.4 Other Entities Involved in the Project

Organization name	Infinite Solutions
Role in the project	Consultant
Contact person	Mr. Jimmy Sah
Title	GM - Sustainability
Address	611, Chetak Centre Main, RNT Marg, Indore - 452001, India
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1.5 Project Start Date

11-March-2011, being the date of commissioning of first WTG installed under the project activity.

1.6 Project Crediting Period

Crediting Period: 10 years 0 months (renewable twice)
Start Date of Crediting Period: 11-March-2011

End Date of Crediting Period: 10-March-2021

The project proponent is undertaking the same project activity under CDM however VCU's shall be claimed only till the day before the start date of crediting period under CDM, i.e. 1/01/2013. The Project Proponent confirms that the Project is also registered under CDM[1] on 28/11/2012 and they will claim emissions reductions from the Project only in one mechanism for a particular period to avoid double counting.

[1] https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1340102581.62/view

1.7 Project Location

District : Dhule

State : Maharashtra

Host Party : India

The unique location information of the WTG is provided in the table below. The WTG numbers indicated in the table below are unique identification number provided by the state utility.

Location No.	Village	District	Latitude	Longitude
JAI-02	Runmali	Dhule	21^0 7' 48"	74^0 16' 3"
JAI-03	Runmali	Dhule	21^0 7' 36"	74^0 16' 4"
JAI-04	Vaskhedi	Dhule	21^0 7' 20"	74^0 15' 58"
JAI-05	Jaitane	Dhule	21^0 7' 41"	74^0 18' 15"
JAI-07	Runmali	Dhule	21^0 8' 16"	74^0 18' 24"
JAI-08	Vajdare	Dhule	21^0 8' 43"	74^0 18' 31"
JAI-09	Akhade	Dhule	21^0 7' 54"	74^0 20' 54"
JAI-11	Jaitane	Dhule	21^0 7' 24"	74^0 20' 49"
JAI-18	Shivajinagar	Dhule	21^0 5' 42"	74^0 20' 15"
JAI-19	Shivajinagar	Dhule	21^0 5' 26"	74^0 20' 11"
JAI-21	Shivajinagar	Dhule	21^0 5' 20"	74^0 19' 39"
JAI-22	Shivajinagar	Dhule	21^0 5' 29"	74^0 18' 59"
JAI-23	Bhamer	Dhule	21^0 5' 41"	74^0 19' 11"
JAI-27	Bhamer	Dhule	21^0 5' 10"	74^0 18' 30"
JAI-28	Bhamer	Dhule	21^0 5' 0"	74^0 17' 45"
JAI-29	Bhamer	Dhule	21^0 5' 17"	74^0 17' 39"

1.8 Title and Reference of Methodology

Title: Consolidated baseline methodology for grid-connected electricity generation from renewable sources

Reference: ACM0002, Version 12.3.0, EB 66

The methodology also refers to the latest approved versions of:

"Tool to calculate the emission factor for an electricity system", Version 02.2.1, EB 63

"Tool for the demonstration and assessment of additionality", Version 06, EB 65

1.9 Other Programs

- Emission Trading Programs and Other Binding Limits: India is Non-annex1 country and there is no compliance with an emission trading program or to meet binding limits on GHG emissions for this project activity.
- Other Forms of Environmental Credit: The project does has not claimed any other form of Environmental credits. Further, the project activity generates Carbon Credits under Clean Development Mechanism (Ref.No:6456) from 01/01/2013. However the VCUs that are claimed are from the date of commissioning till 31/12/2012.
- Participation under Other GHG Programs:.

  This is registered CDM project. The reference no. for the project is 6456 and it was registered on 28/11/2012. Please refer to the registered PDD. The web link for the same is mentioned below:
  https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1340102581.62/view
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2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The project has been implemented and commissioned and been under operation since then except for shut downs due to operational issues.

- First Commissioning of the project activity : 11/03/2011
- Registration of project activity under CDM : 28/11/2012
- Commissioning of WTGs : Please refer section A.2 for details

There were no events leading to impact on the project applicability

2.2 Deviations

2.2.1 Methodology Deviations

Not Applicable

2.2.2 Project Description Deviations

The project was initially conceptualized for captive consumption of electricity generated from the project activity. However, during the operational phase, due to change in government policies, the project used the electricity for captive purpose while at times it had to sell the electricity either to third party or the grid.

In the future as well, the project proponent would either use the electricity for captive purpose or it may sell the electricity either to third party, power exchange or to the grid, based on the regulatory policy applicable at that time.

The deviation does not impacts the applicability of the methodology, additionality or the appropriateness of the baseline scenario. The change is related to the supply of electricity to third party of grid which is applicable under ACM0002 with the baseline remaining constant. Further the additionality is not impacted as even with the change electricity saving rate the additionality is not breached for the project activity.

2.3 Grouped Project

Not applicable.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO2/MWh
Description	Combined margin CO2 emission factor for the project electricity system (NEWNE regional grid) for the year y
Source of data	CEA, CO2 Baseline Emission Factor for Indian Power Sector, Version 06(Valid from 1st March 2011)
Value applied:	0.9487
Justification of choice of data or description of measurement methods and procedures applied	The value applied is taken from the plant from CEA reviews. The weights used for calculating combined margin emission factor are 0.75 and 0.25 for operating margin and build margin respectively.
Purpose of the data	Calculation of baseline emission
Comments	Calculated ex-ante, data will be kept for crediting year +2 years

Data / Parameter	$EF_{grid,OM,y}$
Data unit	tCO2/MWh
Description	Operating margin CO2 emission factor for the project electricity system (NEWNE regional grid) for the year y
Source of data	CEA, CO2 Baseline Emission Factor for Indian Power Sector, Version 06 (Valid from 1st March 2011)
Value applied:	0.9942
Justification of choice of data or description of measurement methods and procedures applied	Obtained from the CEA database on CO2 Baseline for Indian Power Sector, Version 06 as the weighted average of Operating Margin (incl. imports) for years 2007-08, 2008-09 and 2009-10
Purpose of the data	Calculation of baseline emission
Comments	Calculated ex-ante, data will be kept for crediting year +2 years

Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO2/MWh
Description	Build margin CO2 emission factor for the project electricity system (NEWNE regional grid) for the year y
Source of data	CEA, CO2 Baseline Emission Factor for Indian Power Sector, Version 06 (Valid from 1st March 2011)
Value applied:	0.8123
Justification of choice of data or description of measurement methods and procedures applied	Obtained from the CEA database on CO2 Baseline for Indian Power Sector, Version 06 (not adjusted for imports)
Purpose of the data	Calculation of baseline emission
Comments	Calculated ex-ante, data will be kept for crediting year +2 years

3.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,y}$
Data unit	MWh
Description	Quantity of net electricity generation supplied to the grid by the project plant/unit to the grid in year y
Source of data	Credit notes for generation by MSEDCL
Description of measurement methods and procedures to be	Data type: Measured & Calculated

applied	Archiving: Electronic Responsibility: The plant management shall be responsible for the regular recording of data. Calibration Frequency: The meters shall be calibrated by the MSEDCL's testing division annually.[2]
Frequency of monitoring/recording	Continuous monitoring and at least monthly recording
Value monitored:	116,315.344
Monitoring equipment	Monitoring: These values are monitored through main and check meters having an accuracy class of 0.2 and located at the MSEDCL sub-station. Data type: Measured & Calculated
QA/QC procedures to be applied	The meters shall be calibrated by the MSEDCL's testing division annually. Generation values will be cross-checked with energy bill(s) at consumption centre by MSEDCL.
Purpose of the data	Calculation of baseline emissions
Calculation method	$EG_{facility,y} = EG_{facility,y\ export} - EG_{facility,y\ import}$
Comments	*The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.*

3.3 Monitoring Plan

The project activity is in accordance with in accordance to the approved methodology ACM0002, Version 12.3.0, and therefore, can use the monitoring methodology for the same.

SIIL has outsourced the operations and monitoring the performances of the WTGs to Suzlon. The Operation &Maintenance (O&M) responsibility lies with Suzlon. The WTGs of Dhule are centrally connected & monitored by a Central Monitoring System (CMS) located at Dhule and maintained by Suzlon. The captured data from the CMS is then directly uploaded to the Customer Relationship Management (CRM) system, which is an Oracle based database. From the CRM, the daily generation reports are made available to SIIL on the customized website of the respective O&M service providers. The CRM manager is responsible for the monitoring of the WTGs and communicating results to SIIL. SIIL has the overall responsibility for collating the monitored data received from all the two locations. Two feeders of 22.5 MW each are dedicated for Suzlon -16 WTGs (10 nos on one feeder and 6 on the other) at the Sakri switchyard (33/132 KV) .The WTGs are connected through a 33 KV overhead line up to Sakri Switchyard. At the MSEDCL sub-station, the total export & import to these feeders is monitored using main & the check meters, which are electronic tri-vector meters. The total export at this meter is arrived at by multiplying the monthly meter reading to the multiplying factor of the meter concerned. The monthly meter reading is arrived at as the difference between the current meter reading and the

[2] Refer Annexure 1 for Calibration details for the monitoring period.

previous meter reading. The period between these two readings is usually a period of 30 days which may vary. In a similar fashion, total import at this meter is also calculated.

Hence, net electricity export is calculated as the difference between total export and total import at the meter.

Additionally, MSEDCL receives daily export & import figures for each WTG from the O&M service provider with the help of which it calculates the electricity export by each WTG at the WTG controller. The WTG controller is located within the WTG assembly itself. It then arrives at the export value of each WTG by apportioning the reading of the main/check meter in the same ratio at which each of the WTG had exported electricity. The formula applied on each WTG of a particular feeder is as follows:

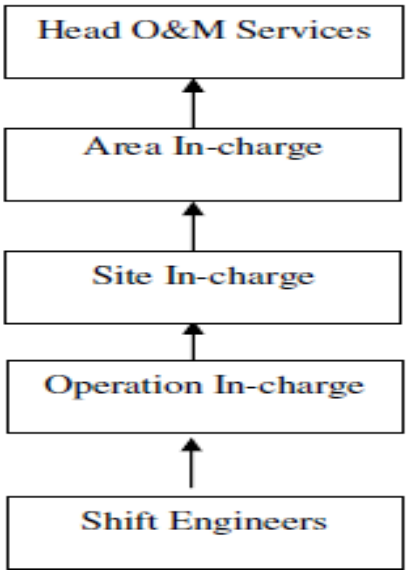
Net export of electricity from WTG to Grid = (% generation of individual WTG connected to feeder) x (Net Electricity Export @ MSEDCL meter for the feeder)

where,
% generation of individual WTG connected to feeder = (Controller reading @ Individual WTG)/(Sum of Controller reading of all WTGs connected on feeder)

The electricity export reports are generated by MSEDCL on credit notes and sent to SIIL through the O&M service provider on a monthly basis. Thus, to further elaborate, it may be said, that every month, SIIL receives credit notes from MSEDCL for each of its WTGs.

Based on these reports, the units billed at the consumption site (in case of captive consumption or sale to third party) are adjusted as per the units of electricity generated at the power generation site after discounting wheeling and transmission losses as contained in the MERC order. In case of sale to grid, the values can be directly used from the credit notes.

The structure of the O&M team is as follows:



The roles and responsibilities of the O&M personnel are as follows:

- Head O&M Services: He is in-charge of overall O&M activities of state/country. The responsibilities include formulation of procedures and decision-making for Operation & Maintenance team.
- Area in-charge: He is responsible for the defined areas with group of wind farms. He has to take timely corrective measures/action to ensure that overall performance of site is met and delivered.
- Site In-charge: He is responsible for daily monitoring of the performance of site operation and under any breakdown situation the WTG should be restored at earliest.
- Operation In-charge: He is responsible for attending the unscheduled breakdown of WTG and ensure that WTG should be restored at earliest. Daily monitoring of O & M team and performance of WTG.
- Shift Engineers: He is directly responsible for carrying out the O & M activity of WTG and to attend the breakdowns on immediate basis and report problem to Operation in charge.

Emergency Preparedness

In case of failure of monitoring meter(s), the grid officials would immediately replace the meter with a calibrated meter.

The O&M service provider would be responsible for maintenance of the necessary spare parts and consumables for the maintenance of the WTGs such as anemometers, wind vanes and sensors, oil filters, batteries, auxiliary motors and pumps, WTG controllers, slip rings, limit switches and sensors, detergents & solvents etc. The service provider will also be ensure the availability of major components such as main gearbox, blades, generator, towers, hub, main shaft & bearings, ground and top controller, cooling and hydraulic systems in the event of a breakdown occurring during the tenure of the O&M. The service provider would also ensure that occupational health and safety procedures are adhered to during the operation & maintenance activities.

The main meter will primarily be used for recording generation. In case of its failure, the check meter will be used for the same purpose. However, in case of failure of both meters, the decision of MSEDCL regarding the generation will be final.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

According to the approved baseline methodology ACM0002, version 12.3.0, EB 66, the baseline emissions are calculated as follows:

$BE_y = EG_{facility,y} \times EF_{grid,CM,y}$

Where

BE_y = Baseline emissions in year y (t CO2/yr)

$EG_{facility,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)

$EF_{grid,CM,y}$ = CO_2 emission factor of the grid in year y, tCO2e/MWh

BE_y = 116,315.644 x 0.9487

= **110,347 tCO_2**

4.2 Project Emissions

Since the project activity is a renewable energy project which generates electricity using wind power therefore there are no resulting project emissions.

4.3 Leakage

As per methodology, version 12.3.0, EB 66, there are no leakages from this project activity and hence leakage is considered as zero.

4.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
Year 2011	46,318	-	-	46,318
Year 2012	64,029	-	-	64,029
Total	**110,347**	**-**	**-**	**110,347**

APPENDIX 1: CALIBRATION DETAILS

For Feeder No-1, 132 KV Sakri S/Stn.			
Connected WTGs (JAI-02, JAI-03, JAI-04, JAI-05, JAI-07, JAI-08)			
Details of Main Meter		**Details of Check Meter**	
Serial No.	04890617	Serial No.	04890556
Make	Elster	Make	Elster
Accuracy Class	0.2s	Accuracy Class	0.2s
Calibration Date 1	20/8/2010	Calibration Date	20/8/2010
Calibration Date 2	17/9/2011	Calibration Date 2	17/9/2011
Meter Replaced		**Not applicable**	
Serial No.	14796437		
Make	Elster		
Type	ABT Meter		
Accuracy Class	0.2s		
Replacement/Calibration Date	26/07/2012		

For Feeder No-2, 132 KV Sakri S/Stn.			
Connected WTGs (JAI-09, JAI-11, JAI-18, JAI-19, JAI-21, JAI-22, JAI-23, JAI-27, JAI-28, JAI-29)			
Details of Main Meter		**Details of Check Meter**	
Serial No.	04890618	Serial No.	04890561
Make	Elster	Make	
Accuracy Class	0.2s	Accuracy Class	0.2s
Calibration Date 1	20/8/2010	Calibration Date 1	20/8/2010
Calibration Date 2	17/9/2011	Calibration Date 2	17/9/2011

Meter Replaced		**Not applicable**
Serial No.	14796436	
Make	Elster	
Type	ABT Meter	
Accuracy Class	0.2s	
Replacement/Calibration Date	26/07/2012	